

METAL CASTING

Project Fact Sheet



PERFORMANCE DATA TO INCREASE REUSE OF FOUNDRY BYPRODUCTS

BENEFITS

There are environmental, economic, and technical advantages to substituting foundry aggregates for conventional virgin granular materials:

- In addition to reducing the amount of materials going to the landfills, processed foundry aggregates are often less expensive than mined and processed aggregates.
- In some applications, such as flowable fill, it can be demonstrated that the processed foundry byproducts perform equal to or better than conventional granular materials.

APPLICATIONS

Disposal of foundry sand is an important issue throughout the foundry industry. The availability of performance data will benefit the industry nationwide. Both controlled low strength material and hot mix asphalt are excellent applications for foundry sand. Use of controlled low strength material reduces settlement in bridge approach slabs and pavement utility cuts. Controlled low strength material also increases the speed of construction. Foundry sand also shows a high potential for value-added replacement of fine aggregates in hot mix asphalt as high as 25%.

REUSE OF FOUNDRY BYPRODUCTS IN HOT MIX ASPHALT AND CONTROLLED LOW STRENGTH MATERIALS REDUCES DISPOSAL REQUIREMENTS AND IMPROVES ENERGY EFFICIENCY

It is estimated that approximately 8 million tons of foundry sands and slags could be available for reuse every year. Most spent foundry sands and slags have characteristics that allow for reuse as fine and coarse aggregates in a number of engineered applications. However, the engineering specifications and technical performance standards for reuse of foundry sands and slags have not been developed. Additionally, the environmental characteristics of foundry byproducts in reuse applications are not universally understood. Compiling this information is prohibitively expensive for most small foundries. Together, these technical barriers constitute major impediments to foundry byproduct reuse activities.

Controlled low strength material (CLSM) and hot mix asphalt (HMA) have been selected as initial targets to address the void of technical data. There are a variety of technical, economic, and environmental arguments that support a focus on these two applications. Both materials have been identified by the Federal Highway Administration as potential uses for foundry byproducts in highway construction applications.

The project will develop a national technical database defining the technical parameters for the use of foundry byproducts in CLSM and HMA, as well as design guidelines for CLSM and HMA mix designs.

BENEFICIAL REUSE OF SPENT FOUNDRY SAND



Field testing of controlled low strength material containing foundry sand.



Showcase Description

Goal: The goal of this project is to develop technical data to validate performance characteristics of foundry byproducts in hot-mix asphalt and controlled low-strength material. The data will be made publicly available and enable the construction industry to evaluate and use foundry sand as an aggregate for various materials.

Progress and Milestones

This two year project was awarded in August 2000. Planned tasks include:

- Coordinate the development of a national technical database resource defining the technical parameters for the use of foundry products in both controlled low strength material and hot mix asphalt.
- Develop user guidelines and technical standards for controlled low strength material and hot mix asphalt mix designs.
- Engage in performance testing of controlled low strength material and hot mix asphalt with foundry sands and slags.

Additional Industry Partners

Badger Mining Corporation
Berlin, WI

EOAssociates
Mill River, MA

Foundry Association of Michigan
Lansing, MI

GM Worldwide Facilities Group Environmental Services Division
Detroit, MI

Illinois Cast Metals Association
North Pekin, IL

Indiana Cast Metals Association (90 companies)
Indianapolis, IN

Kurtz Brothers, Inc.
Groveport, OH

Ohio Cast Metals Association (95 companies)
Columbus, OH

Payne & Dolan, Inc.
Waukesha, WI

Pennsylvania Foundrymen's Association (140 companies)
Plymouth Meeting, PA

Process Recovery Corp.
Sinking Spring, PA

U.S. Environmental Protection Agency
Chicago, IL

Wisconsin Cast Metals Association (60 companies)
Milwaukee, WI



PROJECT PARTNERS

Pennsylvania State University
State College, PA

University of Wisconsin
Madison, WI

American Foundry Society
Des Plaines, IL

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